STOWER PROVOST COMMUNITY SCHOOL

Curriculum drivers

The curriculum is underpinned by the school's Curriculum Drivers: Knowledge, Skills, Community and Self. The spiritual, moral, social and cultural development of our pupils and their understanding of the core values of our society are woven through the curriculum.

Computing Curriculum Statement

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1. Curriculum Statement

Intent

In line with the 2014 National Curriculum for Computing, our aim is to provide a high-quality computing education which equips children to use computational thinking and creativity to understand and change the world. The curriculum will teach children key knowledge about how computers and computer systems work, and how they are designed and programmed. Learners will have the opportunity to gain an understanding of computational systems of all kinds, whether or not they include computers.

By the time they leave Stower Provost Primary Community School, children will have gained key knowledge and skills in the three main areas of the computing curriculum: computer science (programming and understanding how digital systems work), information technology (using computer systems to store, retrieve and send information) and digital literacy (evaluating digital content and using technology safely and respectfully). The objectives within each strand support the development of learning across the key stages, ensuring a solid grounding for future learning and beyond.

Implementation

At Stower Provost, computing is taught in units on a weekly basis. Children will develop depth of knowledge and skills over the duration of these computing units. Being a small, rural school, the units are on a rolling programme.

The rolling programme ensures a balanced and developmental coverage of computer science (programming and understanding how digital systems work), information technology (using computer systems to store, retrieve and send information) and digital literacy (evaluating digital content and using technology safely and respectfully) across each year and within each class.

The children will have experiences of all three strands in each year group, but the subject knowledge imparted becomes increasingly specific and in depth, with more complex skills being taught, thus ensuring that learning is built upon. For example, children in Key Stage 1 learn what algorithms are, which leads them to the design stage of programming in Key Stage 2, where they design, write and debug programs, explaining the thinking behind their algorithms.

As a starting point for the planning of computing lessons, teachers make use of the twinkl unit plans.

Every year, each class will begin with the unit Online Safety. This recaps and extends the children's awareness and understanding of using technology safely online.

Each year finishes off with a Using and Applying unit. This gives the children a challenge to work on a project, drawing on the skills they have developed over the year.

Where possible, the units are linked with other areas of the curriculum to provide the children with a purpose to their learning and motivation. This enables them to see that Computing is not a solitary area of the curriculum.

Our children in Early Years provision will be exposed to the understanding of internet safety as they explore the world around them and how technology is an everyday part of their learning and understanding of the world.

The school has a laptop and iPad trolley which ensures that all the classes have the opportunity to use a range of devices and programs for many purposes within computing sessions and across the curriculum.

In addition, the school has Log-boxes and Crumble equipment. These are used alongside the teaching and learning of Science, Design and Technology as well as Mathematics investigations.

Impact

Our approach to the curriculum results in a fun, engaging, and high-quality computing education.

Ongoing assessments take place throughout the year and are recorded on the Depth of Learning assessment tool or on Tapestry for EYFS. Evidence of a sample of the children's Computing is also uploaded to Share Point Teachers use this information to inform future lessons; ensuring children are supported and challenged appropriately.

Much of the subject-specific knowledge developed in our computing lessons equip pupils with experiences which will benefit them in secondary school, further education and future workplaces. From research methods, use of presentation and creative tools and critical thinking, computing at Stower Provost gives children the building blocks that enable them to pursue a wide range of interests and vocations in the next stage of their lives.

2. Teaching and Learning

The computing curriculum is mapped to ensure alignment with the national curriculum content and programme of study.

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

As part of the introduction to each new unit, teachers review what the children know already and identify what children would like to learn, as mentioned above, to inform the programme of study so that it takes account of children's interests.

In each lesson, children are guided towards the learning intention which is shared at the beginning of the lesson and reviewed by children at the end; this is subsequently used by the teacher during the assessment and review work of children's work and are used to identify individual target areas.

Identified links will be made across the curriculum, where possible and appropriate, to enrich and extend the teaching of other subjects.

3. Assessment

Children's skills will be assessed and developed by the teacher during lessons and through discussions.
Teachers will regularly update the Key Indicators on the Depth of Learning assessment tool or on Tapestry for EYFS.
Samples of the children's work will be uploaded to the Computing folder on SharePoint to monitor the impact of the computing curriculum and how it is being taught.

4. Planning and Resources

Planning

Planning will be the responsibility of the class teachers and, where needed, support from the subject leader will be available.
The rolling programme ensures a balanced and developmental coverage of the Computing Curriculum. The key indicators from Depth of Learning have been mapped out on the rolling programme, proving a balanced coverage of computer science, information technology and digital literacy as they move up the school.
Teachers will need to plan a series of lessons for each unit of Computing to cover these key indicators. As a starting point for the planning of computing lessons, teachers make use of the twinkl unit plans. All of the medium-term plans and lesson plans can be accessed via the shared drive.
Every year, each class will begin with the unit Online Safety. This recaps and extends the children's awareness and understanding of using technology safely online.
Each year finishes off with a Using and Applying unit. This gives the children a challenge to work on a project, drawing on the skills they have developed over the year.

Resources

iPads
Each teacher has an iPad for assessment purposes and there is a trolley of iPads for use within the classroom to support the programme of study.
Laptops
There is at least one laptop each classroom. These machines are networked and have access to the shared drive for planning and preparation. There is also a trolley of laptops for use within the classroom to support the programme of study.
Interactive Whiteboards
Each classroom has an interactive board linked to the class laptop.

Other Resources to support the curriculum

- Beebots
- Crumble
- Log-boxes
- Headphones
- Teams

5. Organisation

The children have a weekly computing session and will study a unit of computing each half-term. Each unit is mapped out on the school's long-term plan.

6. EYFS

In the new EYFS curriculum, there are no Computing objectives to cover.

7. KS1 and KS2

At Stower Provost, children in both key stages are taught about the benefits of the knowledge and skills they are learning, as well as their application in real life contexts and professions.

Key Stage 1 - Subject Knowledge

Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.

An algorithm is a precisely defined procedure – a sequence of instructions, or a set of rules, for performing a specific task (e.g. instructions for changing a wheel or making a sandwich). While all correct algorithms should produce the right answer, some algorithms are more efficient than others. Computer scientists are interested in finding better algorithms, partly out of intellectual curiosity, and partly because improvements in algorithms can result in massive savings in terms of both cost and time.

Use logical reasoning to predict the behaviour of simple programs.

Computers are deterministic machines. We can predict exactly how they'll behave through repeated experience or by developing an internal model of how a piece of software works. Stepping through the program can give a clear sense of what it does, and how it does it, giving a feel for the algorithm that's been implemented.

In the classroom, getting one pupil to role-play a floor turtle or screen sprite while another steps through the program can give a far more immediate sense of what's going on. When working with a computer, encourage pupils to make a prediction about what the program will do before they press return or click the button, and to explain their prediction logically; this is part of computer science. **Logical reasoning** also implies that pupils are following a set of rules when making predictions. Pupils who step outside the boundaries of these rules are not using logical reasoning. A pupil who expects a beebot to jump doesn't understand the constraints of its programming language or hardware.

Use technology purposefully to create, organise, store, manipulate and retrieve digital content.

Creating digital content has many practical possibilities. These include commonplace tasks such as word-processing, creating pictures using paint packages, working with digital photographs and video (including animations), writing computer programs, and creating online content such as blog posts, forum contributions, wiki entries and social network updates. This creative work is digitised (i.e. converted to numbers) once it's on the computer. The sheer quantity of digital information makes the skill of organising digital content more important than ever. In more practical terms, we might think of how to bring together different digital media, how to order a series of paragraphs, how to organise the files in our documents directory, or how to tag photos and posts online. Storing digital content is perhaps something we take for granted. Knowing where a file is saved in the directory structure is important. It's vital to be able to distinguish between the hard disk (or solid-state storage) inside the computer itself, the school's network server, USB disks or memory cards, and online storage via the internet. Manipulating digital content is likely to involve using one or more application programs, such as word-processors, presentation software, or image-, audio- or video-editing packages. The pupil makes changes to the digital content, which might include combining content from multiple sources. The skill here is not just using the software tools, but also knowing how best to change the content for the audience and purpose, and to take into account principles of good design. Retrieving digital content could be seen as the reverse of storing: the skills of opening and saving documents are similar. Retrieving content requires you to know what you called the file, what file type it is, and where you stored it.

Recognise common uses of information technology beyond school
There are many opportunities for pupils to consider the applications of algorithms, programs and systems.

Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies
This statement covers the key principles of pupils' e-safety. Pupils should be aware of the main risks associated with the internet, and recognise that they should not share certain types of personal information online. Pupils must have a clear understanding of what to do if they have concerns about inappropriate online behaviour (such as unwelcome contact or cyberbullying). Telling a teacher or parent should normally be the first response, but pupils should also know that they can talk directly and confidentially to Childline about such matters.

Key Stage 2 - Subject Knowledge

Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them in to smaller parts.
The focus on algorithms at key stage 1 leads pupils into the design stage of programming at key stage 2. Algorithms are the necessary start of the process of creating working code, and identifying the steps needed to solve any problem is essential. Splitting problems into smaller parts is part of computational thinking. For example, designing a game in Scratch will involve thinking about algorithms, programming, drawing sprites and backgrounds, making animations, and even composing music or recording sound effects.

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

Sequence in this context is the step-by-step nature of computer programs, mirroring the sequence of steps the algorithm would list. **Selection** refers to instructions such as if ... then ... otherwise decisions in which the operation (what the program does) depends on whether or not certain conditions are met. For example, a quiz provides different feedback if the player answers the question correctly or incorrectly. It is helpful to refer pupils to selections (choices) they make in everyday life; for example, if it rains in the morning, then I will wear my anorak to school, otherwise I won't. **Repetition** is a programming structure such as a repeat ... until loop in which the computer runs part of the program a certain number of times or until a particular condition is met. **Variables** are used to keep track of the things that can change while a program is running. They are a bit like x or y in algebra, in that the values may not initially be known.

Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

Key stage 2 pupils should be able to explain the thinking behind their algorithms, talking through the steps and explaining why they've solved a problem the way they have. They also need to be able to look at a simple programming project and explain what's going on. This is made easier with languages like Scratch, Kodu and Logo, which feature an on-screen sprite or turtle. The immediate feedback helps pupils to understand and debug their programs. Pupils might also be expected to look at someone else's algorithm and explain how it does what it does.

Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration.

Computer networks, including the internet, are made up of computers connected together. The computers include fast, dedicated machines that pass on data that's not intended for them (called 'routers', 'gateways', 'hubs' or 'switches', depending on particular roles), and 'servers' (always-on machines looking after emails, web pages and files that other computers might ask for from time to time). The connections between the computers in a network may consist of radio or satellite signals, copper wires or fibre-optic cables

Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.

Using search technologies involves aspects of computer science, information technology and digital literacy. Effective use of search engines gets the results you want. It relies on specifying the right keyword, skimming and scanning the results to see which seems most relevant, and distinguishing between the main results and adverts presented as sponsored results. It may also involve using other features of the search engine, including searching for phrases rather than keywords, or limiting searches to a particular time frame, language, reading level or website.

Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

This is something of a catch-all requirement, bringing together various aspects of the computing curriculum. Pupils might typically be expected to demonstrate progression by:

- using software under the control of the teacher
- then, using software with increasing independence

- then, combining software (e.g. importing an edited image or video into a presentation or web page)
- then, selecting software themselves (perhaps from the full range of applications installed on computers, smartphones and tablets at home or at school, or available to them via the web).

Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Safe and responsible use of technology at key stage 2 builds on skills learned in key stage 1. As well as requiring pupils to keep themselves safe and to treat others with respect, the programme of study at key stage 2 introduces an emphasis on responsible use of technology. Pupils need to consider how their online actions impact other people. They need to be aware of their legal and ethical responsibilities, such as showing respect for intellectual property rights (e.g. musical, literary and artistic works), keeping passwords and personal data secure, and observing the terms and conditions for web services they use (such as the 13+ age restriction on most websites, including Facebook, resulting from COPPA10 legislation). Pupils should also develop some awareness of their digital footprint: the data automatically generated when they use the internet and other communication services, and how this is, or could be, used. Pupils should be aware of, and abide by, the school's acceptable use policy, as well as the requirements of any other services they use. Encourage pupils to think twice, and to check terms and conditions, before signing up for internet-based services.

8. Equal Opportunities

Whole school policy on equal opportunities will be adhered to in the computing curriculum. The curriculum is available to every child and all children take part in the activities, making a positive contribution to the life of the school.

9. Inclusion

Children with special educational needs or disabilities will be differentiated for and supported appropriately, to ensure development of skills and equal access to the Computing curriculum. All children will be supported through differentiation, adaptation or adult support, to enable equal access to learning in Computing.

10. Role of the Subject Leader

The computing lead will:

- Monitor the teaching and learning of computing across the school, to support and guide the practice of teachers, ensuring a high quality, broad and stimulating computing curriculum.
- Monitor and evaluate the effectiveness of computing teaching and learning, and liaise and consult with external agencies where appropriate.
- Support and facilitate opportunities that support the continued professional development of teachers in the teaching and learning of computing.
- Oversee and maintain resources to support the computing curriculum.

11. Parents

Parents and carers with specialist computing skills are warmly encouraged to approach the school with support and ideas for clubs, workshops or a discussion about how to support and enrich computing at Stower Provost. The school will actively seek to engage and collaborate with parents and carers with specialist skills for this purpose.